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MEMOIRS
OF THE
GEOLOGICAL SURVEY
OF
THE UNITED KINGDOM.

Figures and Descriptions

ILLUSTRATIVE OF

BRITISH ORGANIC REMAINS.

DECADE III.

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NOTICE.

PALÆONTOLOGICAL researches forming so essential a part of geological investigations, such as those now in progress by the Geological Survey of the United Kingdom, the accompanying plates and descriptions of British Fossils have been prepared as part of the Geological Memoirs. They constitute a needful portion of the publications of the Geological Survey, and are taken from specimens in the public collections, or lent to the Survey by those anxious to advance this branch of the public service.

The plan proposed to be followed in the work, of which this Decade forms a part, is as follows :—

To figure in elaborate detail, as completely as possible, a selection of fossils, illustrative of the genera and more remarkable species of all classes of animals and plants the remains of which are contained in British rocks ; to select especially such as require an amount of illustration which, to be carried out by private enterprise, would require a large outlay of money, with little prospect of a return, and a long time to accomplish, but which, by means of the staff and appliances necessarily employed on the Geological Survey, can be effected at small cost, and with a rapidity demanded by the publication of the Maps and Memoirs of the Survey ; thus, it is hoped, affording an aid to those engaged in the sciences with which this work is connected, that they might not otherwise have possessed, and which may materially promote the progress of individual research.

H. T. DE LA BECHE,

Director-General.

*Geological Survey Office, Jermyn Street,
30th June, 1850.*

B R I T I S H F O S S I L S.

DECADE THE THIRD.

THE third Decade of representations of British Fossils follows up the subject of the first, and continues the series of illustrations of the genera and species of extinct Echinodermata, especially those belonging to the orders *Asteriadæ* and *Echinidæ*.

The genera illustrated in this Decade are partly new, partly long-established ; so also with the species, some of the most remarkable of unpublished forms having been selected, as well as some of the commonest and best known fossils. Yet, even respecting those which are so familiar that their whole history is believed to have been long ago made out, there is so much to be cleared up, so many points of structure hitherto very imperfectly or not at all elucidated, and such an accumulation of synonyms, that their investigation is much more laborious, and occupies much longer time, than inquiries into entirely new types. Thus, three of the fossils figured and described in this Decade, *Hemicidaris intermedia*, *Galerites albogalerus*, and *Micraster cor-anguinum*, are so familiar to geologists and naturalists, so abundant and so well preserved, that authors do not hesitate to cite them without comment, as if they were free from any obscurity. Nevertheless, I may say confidently, that not until now has the literature of these well-known and often-described forms been cleared up, and many of the most important points in their organization made known. Common as they are, no representations of them, presenting sufficient details of their structure, have ever appeared before.

Among the new forms now first described and figured, some are of singular interest. Two of them, the *Lepidaster Grayii* and the *Tropidaster pectinatus*, are not only new as species, but unquestionably possess features entitling them to become the types of new genera. Of those

belonging to old genera, the *Uraster Gaveyi* is singularly interesting, presenting, as it does, the spectacle of a Liassic echinoderm, which so closely resembles the commonest star-fish now living in the British seas, that it can only be distinguished from it by a minute and critical comparison ; and the *Hemicidaris Purbeckensis* is remarkable as being the first member of its tribe ever discovered in strata of the Purbeck series.

The species described and figured have been selected from formations of different geological epochs. From Silurian rocks *Lepidaster Grayii* has been taken ; from older secondary strata, the two forms of *Hemicidaris*, the *Galerites (Holoclytus) hemisphaerica*, chosen on account of its being new to Britain, and also affording an excellent illustration of the sub-genus to which it belongs, and the *Dysaster ringens*, selected for the same reasons ; also the new star-fishes, species of *Uraster* and *Tropidaster*, already alluded to. Of cretaceous fossils there are the critical *Galerites castaneus*, and the characteristic *Galerites albogalerus* and *Micraster cor-anguinum*.

A third series of illustrations of the fossil Echinoderms is far advanced, and in preparation for publication.

EDWARD FORBES.

June, 1850.

BRITISH FOSSILS.

DECade III. PLATE I.

LEPIDASTER GRAYI.

[Genus LEPIDASTER ($\lambda\epsilon\pi\iota\varsigma$, a scale, and $\alpha\sigma\tau\eta\pi$, a star.) FORBES (1850). (Sub-kingdom Radiata. Class Echinodermata. Order Asteriadæ. Family . . .?) Body depressed, stellate, many-rayed; rays short, tapering, covered above with polygonal ossicles; below formed of four series of oblong squamose ossicles.]

SPECIES UNICA. *Lepidaster Grayi.*

The unique and very remarkable fossil figured in the accompanying plate has been communicated by Mr. John Gray of Dudley, a gentleman to whom palæontological science is indebted for numerous and important discoveries among Silurian fossils, and whose splendid collection has been most liberally placed at the service of all engaged in scientific researches.

At first glance it bears a striking likeness to a star-fish of the genus *Solaster*; its general form recalling strongly the aspect of *Solaster papposa*. On a closer inspection the resemblance proves more apparent than real, and no near affinity with that genus can be proved. On the contrary, it not only possesses characters so peculiar as to establish beyond question its right to rank as a separate generic type, but even to render doubtful its position among true star-fishes, and to raise the question whether it be not a linking form connecting that order of Echinoderms with the Crinoids.

The disk of our fossil is a very little more than two inches in diameter. It is, unfortunately, so injured that its elements cannot be clearly made out, but appears to have had a framework composed of closely-set polygonal ossicula. Around it are arranged the rays, equidistant from each other, like so many spokes of a wheel. Their average length is one inch and one-twelfth, and their breadth towards the base four-twelfths. They are all regularly lanceolate. Their under surfaces are exposed on the slab, and are composed of thick transversely oblong plates, slightly overlapping each other in scale-like fashion, and ranged in four longitudinal rows, two on each side of a central or ambulacral groove, which is itself, towards the extremity, in some instances partially filled up by

small polygonal intervening plates. Of the two rows of border plates on each side of the groove, the inner series is formed of oblong obscurely hexagonal ones, with traces of punctations and grooves on their surfaces, as if for spines. The ray that is most perfect exhibits twenty-five plates in each row. The outer series consists of suborbicular or obscurely polygonal plates, which, like the inner ones, are gently convex on their surfaces. The upper surface of the ray, and probably of the body, was composed of numerous small polygonal nearly flat ossicula, closely set, and of various sizes.

Mr. Gray has dissected from the slab the extremity of one of the rays in such a manner as to permit an examination of both upper and under surfaces of the same ray: the result of an examination of the fragment detached confirmed the above description.

Locality and Geological Position.—This star-fish was found in the quarries of WENLOCK LIMESTONE in the Castle Hill, at Dudley. At the same time, a number of encrinite remains of several species, both perfect specimens and fragments, were found associated with it. Mr. Gray states, that after a careful search not even a fragment of another specimen of this exceedingly curious fossil has been detected.

EXPLANATION OF THE PLATE.

Fig. 1. The entire specimen of *Lepidaster Grayi*; its under surface is exposed on the slab.

Fig. 2. Upper surface of the extremity of a ray; greatly enlarged.

Fig. 3. Under surface of the same ray.

EDWARD FORBES.

June, 1850.

Geological Survey of the United Kingdom.

LEPIDASTER
(Silurian)